The Veterinary Record.

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 37. SEPTEMBER 12, 1931. VOL. 11.

The Warranty attached to Cows sold in the Markets of the South-West of Scotland.*

By

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The subject of the warranty attached to cows sold in the markets of the South and West of Scotland is one that concerns every veterinary practitioner, whether in public or private practice in that area, and as veterinary jurisprudence has now become of sufficient importance to be included in the new curriculum, your committee have thought the present an opportune time to have a discussion on this aspect of the subject, and have asked me to initiate the discussion.

At the outset I wish it to be understood that I lay no claim to any degree of expert knowledge of the legal side of the subject. I look forward to the day when each college will have a course of lectures in veterinary jurisprudence and our graduates commence practice with some knowledge of the law as it affects our work. Dr. Bullock's Handbook for Veterinary Surgeons, of which a second and revised edition has recently been published, at present supplies this want in our curriculum. It contains a mass of information that is not readily obtainable from any other source, and is an invaluable guide to the responsibilities and duties which devolve upon us as members of the veterinary profession. If the Council of the R.C.V.S. insisted on all graduates being fully conversant with this volume before granting them their diplomas the effect would undoubtedly be to prevent friction between members and to make for friendliness and good comradeship in the profession. The existence of such a spirit would be evidenced by the increased numbers who would attend the meetings of local divisions of our association. What, I ask, has come over those members of the profession who were much in evidence when the scale of fees was being drawn up and who have never returned to lend us their counsel in discussing other problems? But I fear I am digressing from my subject. It is to the purely veterinary aspect of the subject of warranty of cows that I would direct your attention.

In order to survey the field I wrote to the various live-stock auctioneers in the South and West of Scotland for a copy of the rules and regulations which govern the sale of dairy stock in their respective marts, and found that each firm was a law unto itself in the matter, and that there was a great divergence between the different conditions of sale in the area. After studying them I came to the conclusion that the purchase of a dairy cow in any of the local markets was a gamble.

In the first place, the general health of the cow is not warranted in any market. Realising as we do that the great majority of the dairy cows that are sold in our markets would react to the tuberculin test, one can understand the reluctance of a seller to give any guarantee that the animal is in perfect health. Many of the marts have either as a condition of sale, or as a notice printed in large characters on their conditions of sale, a prohibition forbidding persons bringing to the mart stock suffering from disease of an infectious nature and threatening prosecution of those who disobey. This is honoured more in the breach than in the observance. We know that if all reactors to the tuberculin and agglutination tests were excluded local sales of dairy stock would collapse for want of entries that could comply with the conditions.

The position of a seller who exposes a cow which he knows to be a reactor to the tuberculin test, or a cow which has aborted, is clear; but the case of a cow or heifer which has been vaccinated with live vaccine for abortion seems to require some consideration. We are all aware that such an animal may be the means of infecting an otherwise clean herd, and I consider that some steps should be taken to prevent such an animal being sold without a declaration being made of its history. There is on the statute book the Epizootic Abortion Order of 1922, which prohibits, *inter alia,* the exposure for sale of a cow or heifer which has calved prematurely within the two months immediately preceding such exposure; but this Order does not seem, in the South and West of Scotland at any rate, to have much effect in limiting the ravages of the disease. This Division has been the means of directing the attention of the profession to the ravages of tuberculosis and suggesting a remedy, and I think that a similar campaign might at an early date be instituted in connection with contagious abortion. I am certain from my experience that it is through auction marts that the disease is spread, and I realise how difficult it is to obtain the evidence which is necessary to bring home the offence to any individual. The number of successful prosecutions that have been brought under the Epizootic Abortion Order is very small and the disease is now widespread in our area.

The warranty attached to cows sold in the area of this Division is almost entirely confined to the cow's udder, and the phraseology used in this connection is worth scrutinising. Some marts, *e.g.*, Wishaw and Ayr, use the expression "correct in the vessel"; Lanark, "sound in the vessel"; Paisley and Falkirk, "correct of tit and udder"; Kilmarnock, "correct in the teats only." The question naturally arises: can a cow be correct in the teat and still unsound in the udder? From the wording of the Kilmarnock rules of sale it would appear that such could be the case.

* Paper presented to the Annual Meeting of the West of Scotland Division, N.V.M.A., held at Glasgow on April 8th, 1931. Received for publication August 20th.

DEPT. OF VET. MEDICINE

The question of correctness of a cow's udder has a physiological as well as a pathological significance, and I propose to devote some time to each of these aspects of the problem.

1.—The Physiological Aspect.

How much milk should a dairy cow give after calving? Off-hand, one would say she should secrete sufficient at least to rear her own calf, but such an amount is too vague for auctioneers, and they have cut the Gordian Knot by disregarding the total amount and considering only the relation which the produce of each teat bears to the remaining teats. A cow is held to be correct in its vessel if it is giving more than half milk from the least of its quarters. The term " half milk " is widely used in this part of the land, but is not always clearly defined in the Conditions of Sale. In Lanark and Ayr the term is clearly defined—" cows giving less than half the quantity of milk out of any one teat than out of any other teat shall be held as not being sound in their vessels." In other words, the quarter giving the least is compared with the quarter giving the greatest quantity, and if the former amount is less than half the latter the cow is unsound.

In Paisley, Wishaw, Kilmarnock and Falkirk no attempt is made in the regulations to define the term half milk, and in Edinburgh no warranty at all is given regarding the quantity of milk a newly-calved cow shall give.

In Perth Auction Mart, when the quantity of milk given by a newly-calved cow is investigated, the product of one forequarter is compared with the product of the other forequarter, and similarly with the hind quarters. In a word, the total amount is disregarded, and a cow which only gave a few ounces would be held to be correct if the relative amounts from separate quarters fulfilled the conditions of " half milk."

It has always seemed strange to me that buyers did not insist on a fuller guarantee; the conditions of sale appear to favour the dealer more than the farmer. Can we suggest a better method? There is room for improvement and I think it will come when milk recording is more widely practised.

Farmers who keep flying stocks, and have to buy in their cows, are at a serious disadvantage compared with those who can rear their heifer calves and keep as stock those cows descended from cows that are milk recorded and have a good average.

Under present conditions farmers sell the cows which produce least milk and those that they have some suspicion against, either their health or breeding qualities. They do not sell their best.

2.—The Pathological Aspect.

This embraces a very wide field, and I shall only mention a few cases and leave the remainder to be raised in the discussion.

If a cow which is sound in the vessel only gave sterile milk, when drawn under aseptic conditions, then the line of demarcation between sound and unsound vessels would be easily drawn; but we know that such is not the case, and in consequence there arise the innumerable wrangles which we, as professional men, are called in to decide. Where a palpable lesion exists there should be little doubt, but often there is a further question in these cases. Is the lesion the result of an old or previous attack of mastitis, or has the condition, which one is called in to examine, arisen *de novo* since the day of sale? Personally, I do not pretend to be able to decide such questions, and would like some information from those who claim to be able to do so.

I have examined by palpation many thousands of udders and have time and again been impressed by the protean character of the lesions that are encountered. Heat and pain are not always present in the early stages of mastitis; microscopic examination of the sediment thrown down on centrifugation does not help one to fix the age of the condition, and our experience, though useful in the general case, avails little in the particular case I have mentioned.

If we knew how the organisms, which all agree are the exciting cause of mastitis, gained access to the udder tissue we might be in a better position to form an opinion, but at present it is a matter of conjecture whether the organisms reach the udder *via* the teat canal, cracks in the skin of the teat, the blood stream, or the lymphatic system. It is possible that the organisms are present in the udder as commensals and require a predisposing factor to operate, which has the effect of changing their rôle from commensal to pathogenic.

There is one aspect of this question which is likely to arise within the near future but which, so far as I know, has not arisen. I refer to the presence of abortion organisms in milk. Research workers agree that the milk of a cow infected with *Brucella abortus* contains these organisms in large numbers, and recently observers in this country have proved that some obscure cases of irregular fever occurring in human subjects were due to this organism. Abroad many thousand such cases are on record and an investigation is at present being carried out in this country to find out whether a similar state of affairs obtains here. It would be strange if we had an almost complete immunity, as our statistics apparently show, when we consider how widespread contagious abortion is in our herds, and the extent to which raw milk is consumed all over the country with the exception of the larger towns.

To those who are interested in this subject I would commend a perusal of Report No. 56 on Public Health and Medical Subjects, issued by the Ministry of Health and obtainable at H.M. Stationery Office.

It is difficult to prove the presence of *Brucella abortus* in milk by the ordinary method of examining microscopically a smear made from the centrifuged deposit, and other means are employed, but for the purposes of this paper it may be taken that the presence of *Brucella abortus* in milk can be established, and in view of the danger to man a cow secreting these germs cannot be correct in the udder.

This is the circumstance I had in mind when earlier I mentioned the case of the cow which had received the live vaccine put out by the Ministry of Agriculture, and which had never aborted. The ordinary farmer does not look on such an animal as being infected and it is not surprising that epizootic abortion runs riot in our herds when such cattle can be sold indiscriminately in the marts of the country. I confess that nothing short of scheduling the disease and quarantining infected herds would avail much; but the result of our present *laissez faire* attitude towards the disease is ruining our herds and proving a disastrous

policy. Should the present investigation into the extent to which man is infected by drinking milk containing abortion organisms show that there is an appreciable danger to public health from this source, then some further steps will require to be taken to control this scourge in our herds.

During the few years that the Tuberculosis Order has been in operation another class of case has frequently arisen, and I am certain that many of my listeners will be able to give their experience of it. The circumstances often are as follows. The purchaser of a newly calved cow notices an induration of the udder within the few days allowed by the conditions of sale for notifying any fault, and makes representation that the cow is disconform to warranty. He also asks his private veterinary surgeon to examine the cow and supply him with the necessary certificate to support his claim for the return of the cow. The owner, or possibly the veterinary practitioner on his behalf, notifies the Local Authority under Article 2 of the Tuberculosis Order, and a sample of milk from the affected quarter is taken by the County Veterinary Officer who serves a notice on the owner or person in charge of the animal under Articles 10 and 11. The effect of this article is, *inter alia*, to compel the owner or person in charge to keep the animal isolated until the examination of the milk has been completed, which may take any time up to six weeks. These cases are productive of much ill-feeling and could often be obviated if the veterinary examination of all dairy cows were carried out in marts prior to sale. To enable this to be done satisfactorily every calved cow should be milked on the morning of sale, prior to exposure. It is impossible to carry out a satisfactory examination when the udder is gorged with milk, and if this procedure were adopted, much unnecessary cruelty would be prevented. The "hefting" of dairy cows, prior to sale, is a scandalous practice and we should do all in our power to discourage it.

Discussion.

Mr. J. F. Taylor, in opening the discussion, said: We are all indebted to Major McGregor for bringing forward this subject. He seems to be fired with the idea that we must tackle one by one the various subjects which cause no end of worry to us in our daily duties. This Division is fortunate in having such a member, who not only suggests a subject for discussion but is prepared to come forward with the initial paper. Such a willing worker is a real asset to us. I was delighted to hear of the subject until our Secretary 'phoned me to say that he expected me to open the discussion; that is a duty which has previously been well performed by one of our senior members, and I would have preferred to hear their views first.

Major McGregor refers to the absence of many veterinary surgeons from our meetings. I may say that our Divisional Meetings are always looked forward to by me, and to our social intercourse there I attribute much of the good feeling which exists among the practitioners around me.

Coming to the subject before us to-day, Major McGregor puts it in a very concrete form when he says the purchase of a dairy cow is a gamble.

As we pass through a byre a client will often remark that such and such a cow is not up to the standard, and he intends to sell her at the calving.

Many of the troubles caused by the purchase of cows to keep up a certain milk supply could be avoided if our farms were equipped with a good young stock byre. It is ridiculous that a farm should be let as a dairy farm and yet the only accommodation provided for calves is a spare stall in the byre, a disused pig house or any odd corner in the stable, where sunlight never enters. No wonder farmers in dairy districts give up the rearing of calves as unprofitable, and fall back on the doubtful course of buying milk cows.

No guarantee of general health is given at our marts. As far as my experience goes, the auctioneer at the particular mart seems to be the final judge in the interpretation of the Rules of Sale. I consider that a cow-in-milk should be milked previous to sale instead of usually being "hefted." A buyer could then, if careful, satisfy himself as to any induration temporarily obliterated by "hefting." The farmer, when he finds them on taking possession, begins to think of the consequences of a visit to his byre from a veterinary inspector. We must keep in mind that under the Tuberculosis Order all induration of the udder must be reported. In practice, a veterinary surgeon uses some discretion here, otherwise our County Staff could not cope with the work.

When a cow with a slight induration, due to an old attack of mammitis, is "hefted" for a sale, the extra distension of the udder pressing on the old lesion is almost certain to renew its vitality, and then the discussion begins as to whether the condition is old or new. It may be painful; at the visit of a veterinary surgeon temperature may be up, but the condition may be caused all the same by the folly of the seller.

With regard to induration of the udder, I would say that if it can be detected at time of purchase, the udder is unsound, and the Sale Rule should make provision for its rejection, irrespective of quantity of milk. Sellers would then need to declare such at time of sale.

The overfeeding of a cow about to be sold is another matter which might claim our attention. Who has not seen the cow "fed for the sale day" and experienced the loss of such an animal immediately the purchaser has taken it home? He has no redress, provided the Market Regulations *re* milk or udder have been complied with. Such a cow on entering its new home has such an attack of indigestion that the milk supply is gone. I wonder if Major McGregor would allow us to reject that cow as deficient, because she is not giving enough milk to feed a calf.

Major McGregor does not mention the stiff teat. The secretion of milk from a certain quarter of the udder may ultimately be sufficient in quantity to pass the test *re* measurement, and yet the milker has spent the bulk of his time trying to coax it away. Should a teat which requires such patience be considered normal, under Sale Rules?

Regarding the method of measuring the milk given, the best procedure would be to weigh it.

Recently I had an interesting conversation with a client who is an enthusiastic exponent of milk recording.

He informs me that in his own dairy herd the majority of the cows give less milk out of the two front quarters than out of the hind ones. With this knowledge, I think the proper rule to be followed should be to compare an alleged deficient forequarter with its opposite, and the same behind, bearing in mind that a reasonable quantity is expected. My theory would, of course, be exploded if both forequarters were deficient, but in our practice we have often to use common sense in our judgments.

The cow only giving a few ounces is not a milk-yielding animal, she is an imposter, and therefore, in my opinion, unsound and should be rejected.

I would put in a plea for milk recording. Many byres contain cows which are unprofitable milkers and should be fattened off. I consider that the milk record might be stated oftener in the Sale Catalogues than it is.

Cleansing Cows.—I am aware that some marts have a rule giving a guarantee of a calved cow being "cleansed correct." I would like to have Major McGregor's views on how this can be interpreted. We are all aware that we may cleanse a cow, especially after twins, to our own satisfaction, and yet be called back some days later when we require to syphon off an accumulation of fœtid discharge collected, due to the loss of the power of the

womb to contract naturally after over-distension by twins. Should "cleansed correct" include such a cow or be confined to one which actually shows a piece of placenta?

With regard to "guarantee of general health," I think the reason for withdrawal of it from the Market Rules was the number of court cases which followed the death of a newly-bought cow. I remember being present at many of these *post-mortems*, and with what delight the respective side hailed the presence or absence of tuberculous lesions. My recollection is that this settled whether the cow was sound or unsound at date of sale.

We have travelled far since those days, and I would scarcely advocate such a course until our Eradication Scheme gave to Scottish herds a practically clean bill of health.

Abortion at Marts.—I think that no effective steps can be taken to deal with this, until the sale or use of anti-abortion vaccines is prohibited. Some good results have followed the use of such vaccines in some badly infected dairy herds, but I consider on a whole the disadvantages are greater than the advantages. Unless the actual act of abortion can be proved, the Epizootic Abortion Order, 1922, is of no use in preventing aborted animals being sent to a market.

I was involved recently in a case where the agglutination test proved positive. Two veterinary surgeons called by the prosecution were asked in turn—How long before date of examination could the animal have aborted and would a dose of anti-abortion vaccine cause a positive reaction to the agglutination test? The period under dispute was six weeks. It had to be admitted that the positive reaction to the agglutination test showed the presence of the bacillus in the blood, but how long it had been there was unknown. It had also to be admitted that animals treated by vaccine would give a positive reaction for a long period. The case was dismissed without calling witnesses for the defence.

Major A. Douglas said that in taking any action over warranty of cows they should remember that many mart rules were *ultra vires*. That had been proved in Court. He was disappointed that the speaker had not said more about reacting cows. Usually it was incumbent on the seller of a cow to declare any known fault. In the case of a cow which had reacted to the tuberculin test was the capacity to react a "known fault?"

Uneven quarters were the cause of much dispute, but it was a striking fact that a cow giving only a cupful of milk from each teat was not disconform to warranty.

Referring to abortion, Major Douglas said that the Epizootic Abortion Order did not impose any obligation to declare the existence of abortion. It only put certain restrictions on the sale or exposure for sale of any cow which was known to have calved prematurely within the preceding two months. Apart from the title of the Order there was no reference to contagious abortion.

Professor W. Robb drew attention to the looseness of the phraseology in which rules of sale were couched. Very often auctioneers did not understand their own rules. An important Court case had resulted in a decided clarifying of the language of warranties regarding uncalved cows. No-one nowadays warranted a cow "to calve correct of her vessel." The cow could only be warranted to be "correct of her vessel" at the time of sale.

Mr. Begg, Junr. said he was often consulted about new, uncalved cows which, when lying, showed a protruding portion of the vagina. He agreed that such cows usually calved without mishap or ill effects, but he would like to know if they could be considered as strictly conforming to warranty.

Professor G. F. Boddie had had trouble over the phrase "warranted to calve correctly," and emphasised that on no account should it be used.

When mammitis was found in newly-bought cows it might be either an entirely new occurrence, or a flare-up of an old condition. If it were the latter he thought the purchaser was often at fault in not detecting it at the time of sale. Detection then would save disputes afterwards.

Often for some days after calving a cow gave blood-stained milk. Such milk when yielded from all quarters did not constitute a breach of warranty, but blood-stained milk from one quarter undoubtedly did.

Mr. A. Thomson said he did not wish to add anything to the discussion, but he would like to congratulate Major McGregor on his choice of a subject and the able way in which he had presented it.

Mr. Esmond Brown said he was glad to have had the opportunity of being present at the meeting. In whatever district he chanced to be he liked if possible to attend the divisional meeting.

Speaking of abortion, he said that apprehension was often expressed about the possibility of spreading disease by the use of live vaccine. Live vaccine, whatever its faults, had at any rate helped the farmer to keep up the milk supply.

Mr. P. Wilson observed that in examining new cows which were found to be "wrong" in the udder, the great difficulty was to decide when the disease had arisen. At present there were really no definite means of distinguishing between new and old weeds. He would like to see a serious investigation made into this matter, with the object of mapping out a train of symptoms which would guide practitioners in reaching a decision.

Other difficultics which were often encountered were "showing the calf-bed" before calving, coughing and snoring. The rule at Lanark Sale was that if faults such as these were not declared before sale the cow was returnable.

Regarding abortion, Mr. Wilson said that so far vaccination was their best weapon, and saved much loss to the owner. Under the new conditions of supply vaccination could not do much harm. Segregation of the affected cows could seldom be carried out with the necessary completeness.

Mr. David Brown strongly expressed the view that sellers should not guarantee health at all, either in calving cows or in back-calvers.

He was a great believer in live vaccine for contagious abortion. Legislation on abortion at present would only frighten consumers of milk.

Major Douglas said that at Ayr Sale calving cows were warranted correct at time of sale, and back-calvers were warranted to calve correct.

Mr. J. Lindsay maintained that back-calvers could not reasonably be warranted at all.

He explained the procedure at Dumfries Sale. There the purchaser was given two hours in which to examine any cows he had bought. In the case of a complaint being lodged, the cow was then examined by a layman employed by the auctioneers. If difficulty arose a veterinary surgeon was called in. The system worked well.

Abortion, in his opinion, was worse than tuberculosis.

Professor G. W. Weir said that at Ayr the seller had to divulge anything known to the detriment of a cow's health. That included reaction to the tuberculin test and vaccination with live vaccine.

He would rather buy reactors than aborters.

The Secretary (Mr. D. Campbell) expressed satisfaction at the brightness of the discussion they had had. Major McGregor had been doubtful as to whether his paper would arouse a great deal of interest, but the discussion proved that doubts were needless.

There were two points in Major McGregor's paper upon which he wished to touch. One was this question of what constituted "half milk." He had found three different methods in use of computing "half milk," and they might all give different results. One was to compare the quantity of milk from a teat alleged to be deficient with the average obtained from the other three teats; the second method was to compare a teat with its fellow of the opposite side; and the third was to take the highest-yielding teat as the standard, and compare all other teats against that. Mr. Campbell strongly urged the third method, and said it was not too exacting to ask that the lowest-yielding teat should give half as much as the highest.

The other matter he wanted to speak about was the instance referred to by Major McGregor of the new cow found to have an indurated quarter, but giving apparently good milk in sufficient quantity. "On the advice of his

veterinary surgeon the buyer reports the case to the local authority, whose veterinary inspector takes a sample of the milk, and after an interval of three or four weeks the owner is notified that the milk is tuberculous. But as the sale rules only allow, say, three days for lodging a complaint, this cow, which was warranted correct in her udder, has by this time, been paid for as being conform to her warranty!" At present there seemed to be no redress for the purchaser.

The President (Mr. Meikle) said he wished to congratulate Major McGregor on his most interesting paper, and on the animated discussion it had provoked. There were many things that he himself would have liked to say about it, but it was now getting late and he would have to hold back his views for some other suitable occasion. He would just call on their essayist to reply to the discussion.

The Reply.

Major McGregor, in reply, confessed that he was agreeably surprised at the discussion which had taken place over the question of "Warranty in Cows."

The situation in the West of Scotland was chaotic, but one hoped that the recently-formed Association of Live Stock Auctioneers would draw up a model set of Conditions of Sale which would make the purchase of cows less open to misunderstanding than it had been in the past. While many local "rules of sale" might be *ultra vires*, it was noteworthy that their illegality was only referred to when it suited the case of the complainer.

With regard to "known faults," he agreed that a reaction to the tuberculin test should be revealed at the time of sale. In the present state of our markets it did not prejudice adversely the sale of such a cow to say it had reacted; provided the cow was in good order and gave evidence of being a good milker.

Dealers competed for such a cow, and one wondered if, when it next came under the hammer, the known fault was again declared.

Mention had been made of contagious abortion in relation to the sale of cows. This aspect demanded more attention than had yet been paid to it. The present order was a step in the right direction, but it did not go far enough. The sale of vaccinated animals should be subject to a declaration of their character as potential carriers of disease to free stocks. If their discussion that day had helped to bring about a measure of uniformity in the method of estimating the deficiency in the milk of one or more quarters of an udder, then they had done well. Their Secretary had given them a lead in the matter, and he concurred in the opinion he had expressed. After referring briefly to several other items which had arisen during the discussion, Major McGregor thanked the members for their helpful criticism of the subject.

"In the long run the future of East Africa will turn, not on political readjustments, but on the campaign against the tsetse fly. To breed successfully the fly requires food, water, shade, and something else which science has not yet discovered. Meanwhile, its actual breeding places can be noted, and the Uganda veterinary department is destroying some of them, thereby, it is hoped, opening up quite large tracts of country to resettlement."—*Observer.*

When a three-year-old bullock was slaughtered at Smithfield, seven pounds of rusty nails and screws, a silver brooch, the remains of a rubber Wellington boot, part of a bowler hat, a shoe buckle, and several pieces of copper wire were found in its stomach.

The animal was in perfect health before being killed.

Professor John Share Jones, of Penthrebyehan Hall, Wrexham, prospective Liberal candidate for Oswestry, has informed the divisional Liberal executive that he will not stand as Liberal candidate for the division at the next election. Health reasons are stated to be the necessity for the withdrawal of his candidature.

Some of the Common Diseases of the Rabbit.*

By
Henry Gray, M.R.C.V.S.

As the wild fur-bearing animals of the world are becoming rapidly exterminated, enterprising peoples are endeavouring to supply the deficiency by breeding and rearing many species under semi-domesticated conditions. In consequence of these species usually being kept in an artificial environment on intensive lines and on a dietary not always natural to the species, disease becomes frequent and often occasions serious loss to their proprietors.

Most of these affections, if not all, are preventible by strict hygiene.

A great number of the diseases of rabbits are due to macro- and micro-parasites belonging to the animal kingdom and therefore are included in protozoology or parasitology.

Coccidiosis.

The commonest disease in the young rabbit is coccidiosis, which accounts for 95 per cent. of its mortality. It usually attacks them between two and three months of age, but is not infrequent in suckling rabbits of three or four weeks. Its incidence lessens after four months and is somewhat rare at six months, while it seldom causes death after that period unless from the serious lesions such as cirrhosis of the liver or chronic enteritis set up in earlier life. Although deaths from coccidiosis are rare after six months of life, nevertheless adult animals may remain carriers of coccidia, which they pass in their fæces and thus spread the infestation to future generations of young animals. There is no doubt that some families, strains or varieties, are more susceptible than others to invasion of the parasites and that seasons and nutrition play some part in their incidence. The disease is, however, much more frequent when the food is very succulent, probably due to excessive moisture of the fæces, which favours sporulation of the oöcysts outside the body. In consequence, its frequency is most in spring and early summer when the herbage is more luxurious and succulent. Moist warmth also favours sporulation, which operates better in the presence of oxygen of the air than where carbonic and other gases abound in the intestine.

There are at least two species of coccidia which invade the system of the rabbit. The one that develops and multiplies in the *walls of the bile ducts in the liver* is *Eimeria stiedæ*, which sets up lesions that limit or destroy the function of the liver and often terminates in the death of the host. The coccidia travel with the bile into the gall bladder from which they eventually pass into the intestine and become evacuated with the more or less liquid fæces. On examination of the yellowish spot- or streak-like lesions of the liver or of the bile in the gall bladder under the microscope uncountable numbers of coccidia are observed. The intestinal contents and the

* Paper presented to the Third Rabbit Conference, held at the Harper Adams Agricultural College and the National Institute of Poultry Husbandry on Friday, August 14th, 1931.

evacuated fæces show many of the oval parasites or oöcysts in the microscopic field. Found in the latter situations, it does not follow that the coccidia are from the bowel wall as in the intestinal form of the disease. Not more than 5 per cent. of deaths from coccidiosis are due to the hepatic or liver form, whereas 95 per cent. are occasioned by the intestinal form.

The *intestinal* form is due to a different species of coccidium, *Eimeria perforans,* which confines its ravages to the epithelial cells of the mucous membrane and minute glands of the intestine, mainly the large bowel but sometimes the small intestine. The sporozoites derived from breaking up of the oöcysts are endowed with the power of locomotion and when they gain the intestine by means of food or water they enter the epithelial cells, in which they develop and consume, thus leaving the mucous membrane unprotected, so that microbial life or toxic principles gain access to the circulation and destroy the life of the host by auto-infection or auto-intoxication. A healthy mucous membrane has under ordinary conditions a selective affinity for the ordinary microbial flora or biochemical products, but a diseased or inflamed membrane cannot resist their invasion or absorption. This is well exemplified in the case of the healthy bladder when many times the mortal dose of strychnine is injected into it without injurious effect, whereas when injected into an inflamed bladder it rapidly destroys life. Anthrax is a good example of microbial life. When the bacillus of anthrax is introduced into the healthy intestine it produces no effect, but when given with sharp prickly material which injures the mucous membrane systemic infection becomes rapid and destroys life somewhat suddenly.

When the parasites have consumed the epithelial cells and become more or less mature they fall passively into the lumen of the channel or canal, such as the bile duct or intestine, and mingle with the secreta or ingesta and eventually escape from the system along with the fæces.

It is not always a single infestation of the alimentary channel that is the cause of death, but a repeated intake of the sporozoites with the successive soilings of the food with infested fæces. It follows, therefore, that repeated cleansings of the hutch-ground surface will prevent serious losses. The disease may be checked and overcome by rigid hygiene, as I have on numerous occasions observed on young rabbits from rabbitries badly infested. Merely a repeated cleansing of the hutch floor and keeping it dry with sawdust has prevented the animals from dying or even shewing signs of illness, when their fellows at home, kept in their usual surroundings, had succumbed.

From the time the coccidia enter the alimentary canal to the time the first symptoms become manifest, it takes about seven to fourteen days when most people find the attacked either dead or dying in a state of coma or in convulsions. Older rabbits, especially in a good condition, may linger longer before succumbing. This is mostly seen in the liver form of the malady, when the animal may last long enough to become emaciated and show a distension of the abdomen in consequence of the liver becoming much enlarged. Diarrhœa or "scours," which is only a symptom seen in various diseases as well as in coccidiosis, is mostly observed, but in many cases young rabbits never show this symptom, passing naturally-formed pellets or becoming constipated, yet found dying after appearing lively and apparently well the day before.

In winter, when succulent food is somewhat scarce, the disease runs a slower course and the animal often becomes constipated and manifests an enlarged or distended abdomen, profuse urination and more or less emaciation or unthriftiness or stunted growth.

Although many animals apparently recover from the original disease its secondary effects often become serious in consequence of the damage done to the liver or to the walls of the intestine. When the damage done to the liver is extensive cirrhosis is set up, the hepatic circulation becomes constricted, the biliary secretion lessened and there is often abdominal dropsy and hydrothorax. The diminished function of the liver and the lessened secretion of bile, which is the natural laxative and intestinal antiseptic, also interferes with the peristalsis of the bowel and other functions of the digestive system, which predisposes to impaction of the large intestine that has a backtelling effect on the smaller or anterior intestine and the stomach, which become in their turn impacted.

Again, destruction of the epithelial lining of the intestinal mucous and submucous membranes with more or less damage done to the mucous and other intestinal glands (which, under natural conditions, secrete a material that lubricates the bowel or aids in digestion, or in other words promotes the proper function of the system in general) predisposes to impaction of the bowel or creates paralysis of its walls. This predisposition may remain dormant until the animal is submitted to a chill, more noticed when the weather is wet and chilly and the wind in the north, or when there is sudden change of food, irregular feeding or improper food, and impaction of the stomach or intestine and often tympany or rapid gas evolution is set up. Not infrequently the stomach becomes distended with such an excessive amount of gas that the larger curvature of the organ gives way, allowing its contents to percolate into the peritoneal cavity and occasioning death.

This disease is likely to be mistaken for septicæmia. This latter malady, however, destroys rabbits of all ages, generally in a few days. The liver form may be mistaken for the liver form of cysticercosis, tuberculosis, pseudo-tuberculosis, hepatic form of aspergillosis and other diseases producing lesions in the liver. But microscopic examination of the lesions, bile or intestinal contents or fæces, will settle the diagnosis. It should not be overlooked that in the majority of cases of intestinal coccidiosis very few, if any, naked-eye lesions are observable on *post-mortem* examination.

Unlike most infectious diseases due to bacteria or to filtrable viruses, a recovery does not necessarily give immunity to fresh invasions of coccidia, but as age progresses rabbits become more resistant to fresh exposures.

It is a preventible disease, but the environment or hygienic conditions to which rabbits are usually submitted does not tend to this. Although wild rabbits and hares are liable to its scourge, they are not often attacked by it as they lead a free life and rarely feed on the ground which they have contaminated with their fæces. Again, they instinctively seek living plants which are beneficial to their well-being and do not crowd together to over-contaminate their surroundings.

It is the opposite with the domestic rabbit, which is generally confined in a small and most insanitary hutch.

During early life the young animals are crowded together and frequently one litter is mixed up with another; thus, if one or more are infested with coccidia the disease is spread from one to the other and most, if not all, contracting it, succumb. The doe is often the primary disseminator of the parasites, which are scattered about with the fæces she passes in the hutch, and in consequence her offspring develop the disease just before or soon after they are weaned. Weaning young rabbits in an unsterilised hutch is another source. Soiled food, the scraper or cleansing utensils, soiled hands, rats and mice, are so many media of transmission. Freshly acquired animals often introduce it to a rabbitry.

In order to prevent or lessen this too-prevalent complaint the doe should be placed in a sterilised hutch to have her family and be fed on the cleanest of food. The hutch should be kept as clean and dry as possible. In their turn the young animals should be turned into a hutch that has previously been sterilised. One litter should not be mixed up with another. The hutches should be provided with a suitable wire bottom through which the urine and fæces can fall. The feeding utensils should be placed in such a position that the young animals cannot get into them to soil their contents with their feet or fæces, or to scatter the food on the floor and soil it. No more food should be allowed than they will readily consume without any waste.

As to treatment of the disease when it has declared itself, not much can be done to save the lives of those shewing pronounced symptoms of its existence. Creolin in a solution of 1 in 400, given by the mouth through a tube passed into the stomach, is highly spoken of by those who have tried it on rabbits in a contaminated hutch, but not shewing any symptoms of the malady. It is given in doses of from ½ to 1 or more ounces every day or two or three days until the danger is over. Both creolin and dimol in the form of a syrup or in treacle may be given mixed with the food or in water. Let it be understood that very few, if any, disinfecting agents have any effect upon the adult or mature parasite or oöcyst. They have only action on the sporozoite stage when it is endowed with power of locomotion, before it enters the epithelial cell for its nutrition and further development. Freezing does not kill the oöcyst; it only retards its development. In frozen rabbits sent from Norway, Sweden, Spain and other countries, I have found the oöcysts in the intestine five or six weeks after the death of the animal. As said before, they do not develop in the intestine after the oöcystic stage is reached because there is no free oxygen to start the spore-stage in their cycle. After they have reached the outside world where there is free oxygen they sporulate in two or three days or perhaps under certain conditions of temperature a little later, when they become dangerous to the young animals when taken in with their food.

The most destructive agent to coccidia is the flame of a plumbers' or painters' blowlamp. None of the much-vaunted so-called disinfectants is of any value in the destruction of the oöcyst. Boiling water is said to destroy them.

Green food should not be flung on the dirty surroundings of the hutches.

Although every species of domesticated, semi-domesticated and wild animal is liable to coccidiosis peculiar to its species or class, there is no reliable evidence to show that there is transmission from one species or class to the other. Horses, cattle, sheep, goats, pigs, poultry (including pheasants and other gallinaceous birds), rats, mice, cage, aviary and wild birds, all have their own species of coccidium.

Treponemiasis.

This frequent disease is commonly termed "vent disease," venereal disease, pox, or (technically) syphilis or Treponemiasis. Although most prevalent in highly-bred animals, it also occurs in wild rabbits and hares. In hares it often occasions serious losses not only in the British Isles but also in European countries and other parts of the world. It is due to a protozoal parasite or treponeme—*Treponema cuniculi*—which has most of the characteristics of that treponeme *Treponema pallidum* causing syphilis in the human being. It is, however, not transmissible to man and therefore there is no danger from it to human beings. It sets up a chronic ulcerative process on the genital organs but may also, as a secondary condition, affect the eyelids, eyeballs, lips, nostrils and other parts of the face. The disease has long been recognised in the hare as well as in the rabbit as being a similar disease to human syphilis. This was, however, confirmed by Ross who, in 1912, discovered a treponeme resembling that found in man. This observation was ultimately verified beyond a doubt by a great number of observers, included among them being the distinguished scientist the late Professor Noguchi, who termed the causal parasite *Treponema cuniculi*.

Transmission is mainly by copulation and the female is just as capable of infecting the male as the male is the female. It is, however, often contracted from an infected hutch. The period of incubation varies from four or five days to as many months, according to the susceptibility of the victim or virulence of the virus. Its virulence is increased by passage *in series*. The disease manifests itself in the form of small nodules from the size of a rape seed to that of a split pea or a small bean, but when these break down and form ulcers the ulcers run into one another and form sores varying from the diameter of a sixpence to that of a halfpenny. Although usually rounded they may become elongated in outline. After a time the ulcers scab over or have a scaly appearance. They are generally observed on the skin covering the scrotum or sheath of the male, and in the female the edge of the vulva and often extending to the skin surrounding the anal region. They rarely involve the mucous membrane.

Abscesses or ulcers may at times be observed involving the skin at the edges of the eyelids, nostrils, lips or on other parts of the face. Occasionally there is catarrhal conjunctivitis with a more or less muco-purulent discharge from the eyelids and inflammation or ulceration of the glassy cornea (keratitis).

Prevention should be aimed at. Freshly purchased rabbits may introduce it, as may a doe returning after being served by an infected buck, or an infected doe going to the buck.

Animals of no value should be destroyed and the infected hutches sterilised by means of the flame given off from

the blow-lamp. Those of value and worth the expense of treatment may readily be freed of infection by one subcutaneous injection of one of the synthetic preparations of the arsenobenzine series. More than one injection is rarely necessary. Perhaps neosalvarsan or novarsenobenzol, commonly known as "914," which is sold under various trade names, is the best for subcutaneous injection. The dose varies from 0·05 to 0·15 gramme according to the size or age of the animal. Sodium stovarsal is another agent that may be used in similar doses. Both are soluble in distilled water. Allochrysine (double thiopropanol-sulphonate of gold and sodium) brings about recovery without recurrence in from three to five days. The dose is approximately one-twenty-fourth to one-eighth grain of gold to 1 lb. of the live body weight. Some use mercurial ointment applied to the affected parts, but this has no effect on the disease in the general system. It is, moreover, not without danger should the animal lick it.

Young growing rabbits affected with the disease often develop rickets, which is shown by curvature or distortion of the limbs.

Cysticercosis.

This parasitic disease is of frequent occurrence in young rabbits. It is due to the bladder worm *Cysticercus pisiformis*, the cystic stage or larval form of one of the tapeworms—*Tænia serrata*, of the dog. The eggs of this tapeworm are taken in with the food by the rabbit into the system, where they hatch and, after wandering about the system and travelling through the substance of the liver, reach the peritoneal cavity, where they may be found in a free state in large numbers before they have time to take up their final residence in the large ligament of the stomach, in which they become encysted and eventually appear as small, rounded or oval bladder-worms containing clear fluid and a white speck. This white speck is in reality the inverted head of the future tapeworm of the dog. These small cysts have a beaded appearance and vary in size from that of a small pea to that of a small bean. They vary in number from a few up to 30 or 40 or even more. These, after a time, turn a brownish and greenish colour and ultimately shrink. Just like the fluke, they travel through the liver and pierce its capsule to gain the peritoneal cavity where they may be seen in large numbers; that is, if they have not become encysted in their habitat—mostly the large ligament of the stomach but also sometimes in the serous-covered ligaments of the pelvic viscera. Occasionally they are found in other parts such as the spinal canal, where they interfere with the function of the spinal cord and set up paralysis or other nervous phenomena.

In some instances they become lodged or retained in the liver, where they cause mushroom-like projections above the capsule surrounded by a trench. They have a whitish mushroom tint and look like tumours about the diameter of a hempseed to that of a pea.

There is no doubt that when present in large numbers they cause death by anæmia if not by toxæmia. The carcass has a watery, pale and soft appearance, and is somewhat emaciated.

The viscera of affected rabbits should not be given to dogs, as these cysts would be digested and the tapeworm head contents would develop into tapeworms for the dogs to pass eventually and thus again re-infest with their eggs the rabbit and so on *ad infinitum*. Dogs in the vicinity of rabbitries and where the food is grown should be periodically fasted for 24 hours and treated for tapeworms. The worms and segments they pass should be burnt and not scattered on the muck heap for the parasites to continue their cycle.

Cœnurosis.

This is due to a bladder-worm, *Cœnurus serialis*, which has many inverted heads of future tapeworms of another species, *Tænia serialis*, of the dog. This bladder-worm runs a similar cycle to that of *Cysticercus pisiformis* just dealt with. In this case, however, the bladder-worms take up their situation in the connective tissue between the muscles just under the skin. They appear as large bladder-like lumps near the point of the shoulder, on the limbs and in the case of the hind limbs behind or inside the thighs. In this last situation they may be so large and prominent as to cause the animal to straddle in movement. They may, however, be seen in other situations on the surface of the body. They are neither hot nor painful but are covered with a transparent or translucent thin investing capsule slightly adherent to the surrounding lax connective tissue. They vary in size from that of a pigeon's egg to that of a turkey's egg and sometimes they have a lobulated or knobbed appearance. In some instances two or more are attached. They should not be punctured but dissected out. After carefully dissecting away the skin covering their external surface they may be readily torn away from the loose connective tissue. The resulting wound should be closed with two or three fine silk sutures and the surface then painted with tincture of iodine. In a week the wound is healed up.

Occasionally *Cœnurus cerebralis*, so commonly affecting the brain of young cattle, sheep and other herbivorous animals and causing "gid" or "sturdy" or "turnsick," is encountered in the rabbit. It is the larval form of *Tænia cœnurus*, another tapeworm of the dog.

Parasitic Worms.

There are many species of parasitic worms infesting the rabbit. Such are various species of fluke, strongyles, hair-worms, and other nematodes, some of which are common to cattle, sheep and other herbivorous animals. They are mainly encountered in rabbits submitted to the Morant system of feeding or management. They often cause death by anæmia, pneumonia, pleurisy or other secondary maladies not often attributed to parasites. They may be expelled by carbon tetrachloride or, what is safer, hexachlorœthan, oil of chenopodium, oil of male fern, various preparations of areca nut, santonin, Stockholm tar, oil of turpentine, or other anthelmintics. They should be given fasting and followed by a saline purgative, such as Epsom salts, given in a large quantity of fluid. The hutches should be cleansed and treated with the blowlamp so as to destroy parasitic eggs, larvæ, etc., in them.

Salt, iron and other tonic agents, should be given in powder form mixed with damped oats, bran, etc.

External Parasitic Diseases.

These are caused by mites such as those of ear canker, and of mange or scabies, fleas, lice and ticks. They may

be overcome by dressing their locations, as in the case of the ear mites, or all over the surface of the body, as in mange.

Sulphur boiled in rape or olive oil is one of the safest remedies. On no account should oil of tar, oil of sassafras, or other pungent substances, which are often recommended by those who are unaware of their noxious nature, be used, as they are poisonous and often destroy the animals to which they are applied. The same dressing is useful for the removal of lice, ticks and other temporary parasites such as harvest bugs and meal and other mites. For fleas a little paraffin or oil of turpentine may be added to the boiled sulphur oil.

The hutches should be thoroughly disinfested with oil of turpentine. Formalin is too pungent and irritating to the eyes and nostrils.

Tuberculosis.

The rabbit is subject to the tuberculosis of birds, cattle and human beings. The most frequent form, however, is that due to the drinking of tubercle-infected milk of cows. It is seen more in the Angora than in any other variety; it usually runs a very rapid course and always ends in death within three or four weeks. The generalised form is chiefly encountered and there are usually extensive pulmonary, kidney, spleen and bowel lesions. Not infrequently the liver escapes or is only slightly affected.

There is only one practical or economical way in which to deal with this malady and that is to destroy the palpably affected, to tuberculin-test the remainder and to kill the reactors. Of course, the hutches should be thoroughly cleansed and efficiently disinfected. In the case of hutches not worth the trouble they should be burnt. The use of soap, washing soda and boiling water, applied vigorously with a stiff scrubbing brush, is a very reliable method of disinfection in this and other contagious diseases.

Pseudo-tuberculosis.

This often occurs in large rabbitries, but in my experience more on the Continent of Europe than in the British Isles. From the similarity of the appearance of the lesions it is often mistaken for true or Koch's tuberculosis. The lesions have a somewhat similar distribution to those of tuberculosis, but they are more disseminated in the walls of the bowel and liver. The nodules are softer and more circumscribed.

The disease is due to a bacillus or streptobacillus composed of long chains of a thick short bacillus with blunt round ends, which is described by Dor as the *Streptococcus pseudo-tuberculosis rodentium*. It is found widely in Nature and may under certain conditions set up disease in various species of animal. It is the cause of the necrosis of the liver and spleen in nearly all, if not all, the species of cage and aviary bird. It often decimates bird rooms or aviaries of fanciers in this and other countries. It is similarly destructive to rabbits and guinea-pigs.

The affected should be destroyed and their surroundings thoroughly cleansed and disinfected.

Aspergillosis, coccidiosis and cysticercosis and other parasitic or bacterial diseases occasionally produce lesions which are mostly found in the liver but may at times become scattered and give rise to the suspicion that the dead were affected with tuberculosis or pseudo-tuberculosis.

Bacillary Necrosis or Smorl's Disease.

This malady is characterised by abscesses occurring in various regions of the body, sometimes by progressive ulceration of the lips, face and head, and occasionally on the under surface of the feet. It is due to the bacillus of necrosis, which is found everywhere in Nature, but which, under certain conditions, develops in the animal system and sets up disease. It is thought that it gains an entrance to the system by bites, scratches, or by pricks of sharp plants or other bodies. It not infrequently gains an entrance through the edges of the gum surrounding the molar teeth and sets up more or less large abscesses at the angle of the lower jaw.

The period of incubation is from two to 14 days, sometimes longer. The disease takes two to several weeks to run its course, but in mild cases three or four months.

In acute and widely disseminated lesions or extensive ulcerations there is generally a high temperature, great depression and rapid wasting. In such cases death from exhaustion usually follows within one to four weeks.

Highly inbred rabbits are extremely susceptible, but it may also occur in the wild rabbit and hare. Not infrequently it assumes a very virulent form, killing most rabbits in a certain locality. At other times it may spread all over a country or even a Continent.

The abscesses have very little tendency to burst spontaneously. They feel firm to the touch and are somewhat resistant. On opening them they contain a quantity of cream-cheese-tinted pus and of that consistency, with no tendency to run.

When the lesions are in the vicinity of the mouth the animal is liable to die from starvation in consequence of the pain caused when it attempts to open the jaws or to seize food.

As secondary lesions there may be enlargement of the glands, pleurisy, pneumonia, or abscesses in the liver or other organs. A few small abscesses on the surface of the body do not seem to give rise to general disturbance of the system.

If the animal is worth treatment this may be carried out. The abscesses should be widely opened, their contents scooped out and the resulting cavities mopped with a 10 per cent. solution of chloride of zinc. A few days after they may be mopped daily with tincture of iodine until repair has been obtained. The abscesses at the angle of the lower jaw are rarely worth treating as the bone of the jaw is in most cases involved in the disease process and would probably require prolonged attention. The superficial ulcers should be painted daily with strong tincture of iodine.

Cleansing and disinfecting the hutches should be carried out most carefully.

Snuffles or Contagious Rhinitis.

This is undoubtedly the worst disease that can invade a rabbitry, because if it does not always destroy it often remains in a mild form to spread itself and then frequently to break out into great virulence and occasion serious losses. It is seen at its worst in highly inbred varieties, which seem to be more susceptible to it.

As to the true cause of this affection there is grave doubt. Some have attributed it to coccidia, micrococci,

staphylococci, a special bacterium—*Bacterium leptisepticum, Bacillus bronchisepticus*—a pasteurella, influenza bacillus and many other micro-organisms. The probability is that these are only secondary infections, which continue the morbid process, and that its primary cause is a filter-passing virus.

The period of incubation is from three to five days, but it may extend to a week or a fortnight or even longer before any symptoms are observable or have manifested themselves. Its course is generally prolonged, especially if the original infection has been complicated by superadded or secondary infections.

Besides the initial rise of temperature there is more or less nasal discharge, at first watery then mucous and ultimately muco-purulent. This is accompanied by sneezing or a snuffling or snorting sound in consequence of the nasal channels becoming blocked with a variable thick ropy snot. A similar discharge arises from the eyes, often soiling the eyelids, which tend to become glued together. The animal becomes dull and goes off its food. Pneumonia, broncho-pneumonia or pericarditis often supervenes and carries off the victim. At other times there may be a catarrhal or muco-purulent discharge from the ears, or abscesses may appear on the eyelids or other parts of the surface of the body.

The disease is likely to be mistaken for influenza, encephalitis or cerebro-spinal meningitis, especially when it becomes complicated with nervous symptoms, as paralysis.

Prevention should be aimed at by not allowing infected animals to come on to the premises. Does going to an infected stud or infected does going to a clean stud often introduce it. Shows, markets and newly-purchased animals are, however, the principal means of its spread.

Fresh air, sunlight, natural food and cleanliness of the surroundings increase the resistance of animals to this and other contagious maladies. Medicinal treatment is of not much, if of any, value. What is required for its successful treatment is a vaccine to increase the resistance of animals to it and, when it arises, a serum to overcome it.

Isolation and disinfection are called for.

Paralysis.

Paralysis or loss of power in the muscles of any region of the body, especially of the hind limbs, is witnessed in many different diseases such as coccidiosis, spirochætosis, snuffles, influenza, infectious cerebro-meningitis or other diseases of the brain and spinal cord, and is of frequent occurrence in the rabbit. It may also be seen in milk fever or parturient paresis, a disease that appears a few days to a week after the doe has kindled. It may further be due to injuries to and parasites in the brain and spinal cord.

The paralysis of infectious cerebro-spinal meningitis might be treated with injections of sodium stovarsol and that due to " milk fever " with calcium gluconate.

Impaction of the Stomach and Intestine.

This condition is too frequently observed in a rabbitry. It is mainly due to improper or irregular feeding. By nature a rabbit's alimentary system is made to consume food once in 24 hours and its teeth are for reducing the food in the mouth, where it should be mixed with saliva and thus be prepared for the stomach to deal with. The animal system is a bio-physico-chemical machine which is a more delicate piece of mechanism than a motor car, but no sensible man would treat his car as most people do their animals. At the sight of food the mechanism of the alimentary system begins to work in unison in a clockwork manner and unless every part of that mechanism receives suitable or prepared pabulum it is liable to be thrown out of order and impaction of the stomach or intestine, or both, may arise. Over distension of the stomach with a great quantity of unprepared food swallowed ravenously often sets up paralysis of that organ and such food is retained there for several days until death takes place by auto-intoxication or by heart-failure due to compression of the lungs, heart and large blood vessels by extreme distension of the stomach with gases arising from rapid fermentation of the retained food. (Or death may take place from bursting of the stomach). The same occurs in the intestine if the stomach or other anterior sections do not do their preparatory work for that viscus to react upon it. The digestive system and its function in the rabbit closely resemble those of the horse, in which we get similar complaints if treated in a like manner. Irregular and unsuitable feeding was once the cause of the greatest mortality in that animal, but good horse-masters who paid great attention to the feeding and watering of horses reduced such complaints almost, if not quite, to *nil*. The giving of cooked foods or meals to horses would create a very great mortality. It is the same with rabbits: they must use their digestive system as Nature intended. They require coarse food to reduce and the roughage in it acts as a stimulus to the bowel to increase its peristalsis and thus pass on the ingesta in a regular manner; otherwise, retention, impaction and auto-intoxication are liable to arise. Rabbits, as they get very little if any exercise, require less food than if they had to prowl for it. They need to be under- rather than overfed.

Besides impaction, we see in the rabbit, as in the horse, intussusception and torsion of the bowel—all arising from unsuitable or irregular feeding. The rabbit, like the horse, cannot vomit and thus reject improper food, as do the dog and cat and, to some extent, the pig, or even sometimes the ox.

The impaction of the stomach with ingested wool, as is so frequently seen in the Angora, accounts for many deaths. Very little evidence of its existence is manifested until a day or two before death supervenes and then it is only detected when the animal is on the *post-mortem* table.

The rabbit under domestication has as many maladies or disorders as any of the other species of domestic animal. The veterinary surgeon of the near future should have a good general practical knowledge of these animals so as to be of service to those keepers who should care to call him in without undue delay. This and poultry pathology, as well as the diseases of bees and of other small economic animals, should appeal to the woman veterinary surgeon. In many countries in Europe the veterinary schools cater for the needs of the small animal owner and in some of these countries, notably Germany and Russia, certain veterinary surgeons specialise in their maladies as well as in those of fishes.

Exclusion of Psittacosis Infection.

In the course of an address entitled "Some Recent Policies Regarding Particular Diseases," delivered in opening the Section of Public Health at the Annual Meeting of the British Medical Association, Eastbourne, 1931 (*British Medical Journal*, August 15th, 1931. p. 283-5) Sir George Buchanan (President of the Section) said:—"My first topic, psittacosis, may seem a triviality, but it has a certain claim for notice. It very rarely happens that the policy of complete exclusion of the introduction of a particular infection into a country can be attempted with success, especially in these days of rapid transit and in the case of a nation with external communications like our own. We have adopted this policy for rabies, and to some extent for anthrax, and last year it was imposed as an emergency measure for psittacosis. The emergency arose from the discovery of cases of this disease in various parts of the country, all associated with parrot infection, mostly by birds of comparatively recent importation coming to a large extent, though not wholly, through one channel or another from the South American countries—'Amazon parrots,' as they were more or less correctly called. Beginning with a few cases which one regarded merely as pathological and clinical curiosities, the number of people in England affected by this serious illness is a few months had exceeded 100, and at least 25 of these persons died. There were instances in which human case-to-case infection occurred without the intermediacy of the bird, and there were some striking examples of laboratory infection among those working at the pathology of the human and bird disease and trying to identify its virus.

"Meanwhile, many countries on the Continent had a similar experience, and concluded, before we did in England, that the importation of all birds of the parrot tribe had better be stopped. They did this, since the period of infectivity seemed to be so indefinite and prolonged that no mere measure of temporary detention of the birds at the ports would meet the case, even if the necessary quarantine measures were administratively practicable. The additional risk thus arose that England would become the dumping-ground of new and possibly infectious parrots which could not be landed abroad at any European port. The Parrots (Prohibition of Importation) Regulations were the inevitable outcome of these circumstances; and, with one or two exceptions, possibly but not clearly traced to a breach of the order, they have been effective, and there has been no psittacosis in England since. So far good, but no one can contemplate without dismay the indefinite deprivation of our population from the luxury of parrots. Apart from their æsthetic qualities, they appear to create an intense domestic satisfaction, and it is their classical mission to supply material for anecdote. But the difficulty of choosing the safe moment to let them in again is considerable, mainly owing to the difficulty of obtaining facts regarding the prevalence of psittacosis infection, particularly in South American countries, both among the wild birds and at the entrepôts and aviaries at the ports from which they are despatched to Europe.

"It would certainly be desirable to have more evidence than we at present possess that the parrot infection of 1929 was only a passing and temporary epizootic. It does seem fairly certain, however, that the birds frequently transfer infection from one to another after their captivity in the aviaries in which they are kept before sale and in the cages in which they are shipped, and that the mortality in course of these shipments is sometimes extremely high and almost certainly preventable. One may commend in this respect such rules for healthy transport of birds as those enjoined by the Zoological Society—reprinted in Dr. Scott and Dr. Sturdee's report on Psittacosis to the Ministry of Health in 1930—which, if observed, should go far to reduce the risk. Importers who wish to see a speedy revival of the parrot trade—which is said to be considerable and profitable—might do much to enlist public and official sympathy with their aims by themselves undertaking that all cause for criticisms on this score would be removed if importation were again allowed. Such action on their part would, I feel sure, be welcomed also in other countries which are dealing with the same question. The administrative inconvenience of separate action at the different European ports was made plain in 1929-30, and attention is now being given to the practicability at the next stage of common and simultaneous action at them all."

The Suffolk Horse.

"The Suffolk horses that have appeared at the shows of the Highland and Agricultural Society during the past few years have attracted a great deal of attention among farmers and among users of draught horses in Scotland," says the *Scottish Farmer*. "The Suffolk is a clean-legged breed, not so tall as the Clydesdale, and of rounder and wider build. Its great weight, however, is the point in which it takes the fancy of the horseman. Many animals of the breed exceed one ton in weight. The third, fourth and fifth prize geldings at this year's H. and A.S. Show weighed respectively 22 cwt. 21 lb., 18¾ cwt., and 19¾ cwt., and the first and second turned the scale at somewhere nearly one ton each, the average weight of the five being just over one ton. The third and fourth winners were at work until five weeks before the show, conveying oil tanks full of oil, weighing 4 tons 17½ cwt. The secretary of the Suffolk Horse Society has sent us the photograph of a team of six Suffolk gelding, weighing from 18¾ cwt. to 22 cwt., and averaging almost 5 lb. over one ton in weight.

"The Suffolk horse has been criticised in respect that it has not such a good foot as some of the other breeds of horses; but this criticism to-day has much less justification than it may have had formerly, for Suffolk horse breeders have been giving special attention to the improvement of the feet. This has been encouraged by special prizes offered at some of the leading East Anglian shows for the Suffolk horse with best feet. These competitions, first started at the Woodbridge Show, are now a feature of many shows, and in particular the Suffolk county show at Ipswich, where this year there were 47 entries in the best feet competition. The best feet are not judged by the class judges, but by two veterinary surgeons; and, in addition to the silver cup for the owner of the first prize winner, £5 is given to the smith that shod the winner, and £3 to the groom in charge of it. These competitions, it is stated, have resulted in a marked improvement in the quality of the feet of the Suffolk horse."

According to Wallace, University of Minnesota, one species of crayfish, *Cambarus immunis spinirostris*, is an intermediate host of the lung fluke, *Paragonimus kellicotti*, of the cat. Lung flukes are a factor in mink fur farming. It is probable that aquatic animals are the intermediate hosts.

UMI

Clinical and Case Reports.

Glass in Cow's Œsophagus, causing Death.

BY

F. J. Dunning, F.R.C.V.S., Stellenbosch University.

The following rather unusual case is recorded as an instance of the difficulties encountered occasionally in arriving at a correct diagnosis, and a disappointing termination to one's efforts.

A farmer living 20 miles away in the historic Fransch Hoek valley 'phoned me to come out and see a cow which had not eaten for some days and which showed tympany and suspension of bowel movements unresponsive to ordinary remedies. I found her to be a small cross-bred cow with a short, thick neck. Temperature 104·8° F.; pulse 95. Extreme tympany; increased respirations, grunting. The rectum contained a little slime and soft fæces. The owner stated that she was seen eating out of a box of acorns and the tentative diagnosis was that this had caused impaction of the omasum and bowel torpidity. The œsophageal groove was ill-defined and manipulation caused uneasiness, but there was no dribbling of saliva. The stomach tube was passed and on entering the thoracic portion a quantity of blood-stained, slimy liquid escaped from the proximal end of the tube. This puzzled me, but the tube entered the stomach and the tympany was reduced.

I had a suspicion that all was not well in the œsophagus as she objected to the operation, but yet there was apparently no obstruction. As no peristalsis was discernible, ¼ gr. arecoline was given, but without effect. In two hours' time, as the cow was again tympanitic, the rumen was punctured and a full saline purge administered. A further visit was made on the following day, when, as no improvement was seen, a bottle of salt water was administered and the trochar inserted with instructions that it had to be left in for two days. Arecolin, ¼ grain, was given, which caused marked peristalsis and passage of some fluid fæces.

In two days' time the owner 'phoned that the cow continually sipped water in small quantities, but looked very ill and grunted. He had given a bottle of oil and brandy. In response to his appeal I again paid a visit. She was given a half ounce of chloral hydrate per rectum, a local injection of 10 c.c. of a 1 per cent. solution of cocaine, and rumenotomy was performed in the standing position. The stomach walls were closely sutured to the abdominal wall and the rumen emptied of ingesta, a very messy, dirty operation. The reticulum was searched for foreign bodies and a quantity of acorns removed from it. A permanent fistula was then left, a vegetable stomachic given and half a dozen powders left with the owner. The temperature fell a degree in an hour, probably due to the cooling effect of admitted air into the rumen, and the grunting ceased. Three days later the cow was found dead, and being unable to get out, to my regret, the owner conducted an autopsy. He sent me a piece of glass with very sharp edges and points, measuring 3 inches by 1¾ inches, which, he states, was in the œsophagus and that there was a "large abscess in the chest cavity in which a lot of food had collected." My presumption is that the œsophagus had been cut or ulcerated through by the glass, allowing the escape of swallowed saliva and regurgitated stomach contents.

The points of interest are: the intestinal paralysis, the high fever (indicating some severe internal disturbance) the passing of the probang past the obstruction and the ability to swallow liquid medicine and drink water. Also, that she survived two weeks from the onset of symptoms.

Autopsies on South African cattle reveal that glass swallowing is common, but the unusual size of this piece made complete deglutition impossible.

Ataxia in the Cow after Parturition.*

By
N. Iorns,
Royal Veterinary College, London.

The subject, a fourth-calf shorthorn cow, was down and unable to rise on the evening of September 18th, 1930, the history being that the cow was found in labour in the early morning and, as delivery was rather delayed, the calf was forcibly extracted by her owner, a man of powerful physique, and by his stockman.

The cow was quite conscious and had not been milked, and was lying fairly comfortably on the left side. (Her temperature was 102° F.) She was quite unable to rise, although the reflexes were not lost. Examination *per vaginam* revealed considerable tenderness and swelling of the birth passages, which were not torn nor wounded. The conclusion arrived at was that the owner had been somewhat hasty in forcibly delivering the fœtus, a big white bull calf, and in doing so had bruised the passages before they were fully dilated, possibly also crushing the obturator nerves. The treatment consisted of the administration of half-an-ounce of salicylate of soda in 15 ounces of water every six hours, and stimulation of the loins with a mild embrocation, followed by the application of hot blankets wrung out of boiling water, and covered with a waterproof sheet. Next morning the cow seemed more comfortable, and was inclined to feed. A little hay was allowed, and an abundance of drinking water, the medical and local treatment being continued. As the cow had suckled the calf several times the udder was not interfered with. The bowels were open but rumination was suspended. In the evening there was further improvement, and the cow, though still recumbent, had on several occasions been observed to chew the cud. The medicine was now changed to a stomachic and nerve tonic, 2 drachms of acid hydrochloric dil., and 2 drachms of liquor strychninae being given as a draught in 15 ozs. of water every six hours. The following morning the cow was up on her feet, feeding well and ruminating regularly.

* Case in series presented for award under the N.V.M.A. Clinical Prize Scheme for Students, 1930.

Review.

[**Die Rhachitis in Ihren Ätiologischen, Biochemischen, Pathogenetischen, Pathologisch-Anatomischen und Klinischen Beziehungen.** Von Dr. Josef Marek, Prof. der speziellen Pathologie und Therapie und Dr. Oskar Wellmann, Prof. der Tierzuchtlehre an der Veterinär-Hochschule zu Budapest. *Pathologischer Teil,* von Dr. Josef Marek. Jena; Gustav Fischer, 1931. Price, 22 marks.]

This work is being published in two parts, the second of which, by Professor Wellmann, will deal with the essentially biochemical aspect of the subject.

In the present volume Professor Marek covers the whole subject but pays particular attention to the literature (322 references being given) to symptoms, histology and radiography, and to spontaneous rickets and the comparative aspect. The subject is dealt with under the following headings:—spontaneous rickets in man and the domestic animals; artificially produced rickets; a comparison of rickets in man and animals; the alterations in the skeleton and its histology in rickets and other bone diseases; the etiology in the light of recent research; prevention and treatment. There are 354 pages and 171 illustrations, including microphotographs and radiographs.

The greater part of the volume is devoted to the experimental work, for which 21 dogs and 41 pigs were used. The work was planned to assess the effects of variations in the relative and absolute amounts of calcium and phosphorous in the diet, the effects of ultra-violet rays both on the animals themselves and on a part or all of their food, and the results of adding to the diet certain substances known to be rich in vitamin D.

Careful analyses of the food and of the animal *post-mortem* were made by Dr. Wellmann. The data thus obtained showed that the mineral content of the bones ran more or less parallel to the degree of the disease and the deficiencies of the ration. Estimations of blood calcium and phosphorous were also made *ante-mortem,* but these did not accurately reflect the condition of the bony tissues, although the phosphorus was frequently lowered. Radiographs were frequently made and although not particularly sensitive to small changes, formed valuable records by means of which it was shown, *e.g.,* that a diet which produced rickets could be made curative by merely correcting a defective mineral content.

Summarising the experiments on dogs, it may be said that a ration deficient in calcium always led to rickets whatever the amount of phosphorus, that when sufficient calcium was given an excess of phosphorus was not harmful but that when phosphorus was sufficient or more than sufficient an excess of calcium tended to be dangerous.

In pigs it was necessary to supply sufficient of both elements and also to ensure a relatively large excess of calcium as even a slight excess of phosphorus tended to the production of disease.

The effect of feeding vitamin D, and of irradiating the animals or their food was essentially the same. Neither would compensate for a marked deficiency of salts, or a definitely unsuitable balance, nor was either necessary if the total and relative amounts of salts were suitable; but when the defects of the ration were only of a moderate degree—and it is to be remarked that probably most normal diets and some experimental diets would come within this category—irradiation or the addition of vitamin to the food prevented the development of rickets. The basal diet was believed to be practically free from vitamin D.

In the section on the comparative pathology Marek concludes that the disease in animals can only be compared with the so-called late rickets in the human being, because the stage of bone development at which animals are affected corresponds to that of a child of 3½-4½ years and not to that of a child affected at nine months to two years whose bony structures are more comparable to those of an animal still *in utero.* He is of the opinion that, although ultra-violet ray and vitamin therapy are commonly and easily applied in cases in the human subject, investigation would show that in them too the mineral requirements are important.

As artificial mineral addition to a ration, bone meal freed of organic matter, or tri-calcium phosphate can be used to increase both calcium and phosphorus, calcium carbonate or other calcium salt not containing phosphorus the calcium alone, and sodium phosphate the phosphorus only. As far as possible, however, the author prefers to adjust natural foodstuffs, amongst which for herbivora and pigs he recommends where possible feeding with legumes or young grass in the green state whether the animals are housed or out, and in winter good clover or lucerne hay; most grains and the seeds of legumes have a definite excess of phosphorus. For dogs crushed bones will usually supply all that is necessary.

It will be noted that Marek and Wellmann's conclusions differ from those of Mellanby and others. Although the latter found that there was some synergistic action between calcium metabolism and vitamin D, as indeed a certain proportion of Marek and Wellmann's cases also show, they emphasised that a deficiency of vitamin was the more important factor.

Marek and Wellmann's work is well conceived, clearly set out and admirably illustrated; it is a notable addition to our knowledge of rickets.

In the production of this volume the publishers have adhered to their usual excellent standard.

A. W. S.

Belfast City Veterinarian.

The Belfast City Council have accepted without comment the recommendations of the Public Health Committee with regard to the appointment of a City Veterinarian in place of the late Captain J. M'C. Barry, M.R.C.V.S.

These recommendations were that on the conditions of appointment it should be stipulated that there should be no age limit, the position should be a whole-time one, preference to be given to candidates holding the Diploma of Veterinary Hygiene or the Diploma in Veterinary State Medicine, and that when the office of Veterinary Inspector under the Diseases of Animals Acts becomes vacant, the duties of the office shall be discharged by the City Veterinarian.

The salary for the office has been fixed on the same basis as previously, namely £600 per annum, rising by annual increments of £50 to £800 per annum.

The Markets Committee have been invited to state whether they would favourably consider the desirability of the new Veterinarian also acting as Superintendent of the Abattoir.

Administrative Report.

[**The West Riding County Council Veterinary Department. Fourth Annual Report of the Chief Veterinary Officer, 1930-1931.** pp. 47.]

From a veterinary point of view the West Riding is divided into eight Inspectorates, with a veterinary officer for each. There are also nineteen part-time officers, one, two or three to an Inspectorate, according to its size. The whole is controlled by a Chief Veterinary Officer.

Concerning rabies, glanders, swine fever, parasitic mange and contagious abortion, the report has little to say. There were 109 reported outbreaks of anthrax, of which six were confirmed, involving seven animals. Sheep scab shewed a marked improvement, there being 24 outbreaks against 30 for the previous year. The account given of foot-and-mouth disease is practically a restatement of the Orders made by the Ministry under the Infected Areas Restrictions Order for the county and boroughs geographically therein. The remainder of the report deals chiefly with the Tuberculosis Order, tuberculosis, and the Milk and Dairies Act and Order. Under the first-named the following figures are given :—

923 cattle slaughtered, as against 832 last year = + 91.
18,793 ,, examined ,, ,, 18,251 ,, ,, = +542.

Tuberculous udders (giving tuberculous milk)	294 or 31·9%
Tuberculous emaciation	212 or 23·0%
Otherwise affected	413 or 44·7%
Not affected	4 or ·4%

Of 1,192 cattle reported as suspicious of tuberculosis,
675 were notified by the owners,
396 were detected by routine examination,
of which 211 were tuberculous udders,
106 were reported by veterinary practitioners,
of which 20 had tuberculous udders, and
15 were notified by local sanitary officers.

There was a marked increase in the number of reports received during the year (796 as against 658—an increase of 138).

The high percentage and number of cows detected with tuberculosis of the udder is very satisfactory and represents 31·6 per cent. of all animals slaughtered under the Order. For the whole of the country in 1929 the figure was 18·1 per cent.

The county officers examine the cattle of certain boroughs within its area. In this way 13 tuberculous udders were detected; five were slaughtered by the owners, and eight were dealt with by the local authority. In all, therefore, 307 animals dangerous to child life were removed from the general milk supply. What other county contributed as much during the year to the anti-tuberculosis campaign? Certain areas, such as the Sedburgh and Halifax districts seem more free from the disease than others. Of seven prosecutions, one failed and in the remaining six, fines of from £2 to £10 were inflicted by the Bench. The importance of Johne's disease is rightly stressed.

Under the Milk and Dairies (Consolidation) Act, 1915, there were only 29 complaints of sending tuberculous milk into the areas of other local authorities. In the year previous there had been 47. Much of this reduction must be due to routine examination and to the educational value of veterinary officers' visits. In eight cases the offending cows were detected and the diagnosis confirmed by microscopic examination; four resulted from the biological test, three were found by group sampling. Thus 15 animals were detected, in nine cases the supply was proved to be free, and six premises were under investigation at the close of the year. It will be interesting to hear what consuming local authorities have to say of this improvement. In 11 sanitary districts there is a quarterly inspection and some of these are done by practitioners, but the number of times the udders are examined varies. It is often twice a year.

The following table shews the number of visits paid to farms and cattle examined during the year under Article 8 of the Milk and Dairies Order :—

Visits to farms	16,344
Cows in milk	144,177
Dry and in-calf cows ...	13,787
Heifers in calf	13,616
Total cattle examined ...	171,580

There have been great improvements in the conditions under which milk is produced and the cattle kept.

Veterinary surgeons travelled 112,621 miles during the year in the execution of their duties.

Each assistant veterinary officer is provided with a small laboratory for microscopical diagnosis work, and cattle are dealt with on a positive result.

The report ends with an appendix containing three most convincing graphs. The first one shews the increase in the number of tuberculous udders dealt with, before and during the gradual establishment of routine examination. The second shews the rapid decline in the number of emaciation cases during a similar period. There is no doubt that here we see the great value of the veterinary officer. The last one concerns chronic cases.

The subject matter dealing with tuberculosis and the milk supply is a challenge to those who are not in favour of routine examination, and who would rely on tests taking several weeks to locate the premises alone. Bulk sampling detected 16 tuberculous udders only, whereas routine examination discovered 208. If the Tuberculosis Order is going to be of any value, here we see it in operation under the best conditions as against counties where there is no routine inspection and where even the veterinary surgeon to the police only examines the animal reported by the owner and so leaves tuberculous udders and other visibly affected animals in the herd.

The members of the Agricultural Committee, the Public Health and Housing Committee, and of the County Council as a whole are to be congratulated on the work they are doing for consumers and producers and for having such an active Veterinary Department. Many counties who aspire to the prefix "Dairying" and which are doing little or nothing in this direction, would do well to study this report in detail. Towns drawing their milk supply from the West Riding are certainly fortunate. Apparently milk producers are helping. They should push their product. It ought to be worth more per gallon than ordinary milk. They might do worse than adopt the slogan : "Buy West Riding Milk from Inspected Cattle."

One would like to have seen some reference to the number of kinds of cattle in the county, the number of cowsheds and other figures relating to the milk industry.

Abstracts.

[**Some Cases of "Nervous Pregnancy" in the Bitch.** Veterinary Dr. Tasker. *Bulletin de L'Académié Vétérinaire de France.* Vol. 6. No. 4.]

Six cases are presented, analogous to the nervous pregnancy frequently observed by human gynæcologists. No explanation is attempted of the physio-psychologic state.

Observation 1.—Pomeranian, 8 years old. First in heat at 8 months and regularly every 6 months. After two years old the bitch showed, two months after each heat, curious behaviour—adopted a rag, placed it to her abdomen, licked it as if a pup, and became excited and angry if approached. At two-and-a-half years the same phenomenon (only now the subject was a slipper) was observed.

At three years the bitch was covered and duly had four pups, which she reared.

Afterwards at each heat (without being covered) the bitch adopted a slipper and sought to suckle it. The womb was normal, but there was pseudo-lactation.

Observation 2.—Pekingese, four-and-a-half years old, has had two litters. October 21st, 1929, mated. On December 21st called to attend her, as she showed signs of pupping.

Abdomen enlarged and patient nervous and uneasy. On examination no pup was to be felt in the uterus, mammæ congested and a little liquid can be pressed from teats.

The bitch was difficult to approach and was left, and in a few days was normal.

Observation 3.—Scotty, seven years old. Regularly in heat since seven months old and never covered. November, 1929, in season and not mated. January, 1930, abdomen enlarged and milk can be extracted from teats. The bitch is nervous, uneasy; searching about finds a doll which she adopts and evinces maternal care towards it.

Observation 4.—Fox terrier, nine years. In heat at six months and regularly twice a year and never mated. Two months after each heat the bitch shows uneasiness, searches about for pups which she never had. There is pseudo-lactation.

Observation 5.—Cairn, ten months old. In season at eight months; not covered. Two months afterwards adopts a rubber dog. Carried it to her bed and behaved towards it as if she was nursing a pup.

No lactation nor enlargement of uterus.

Observation 6.—Briarde. Two years old. Regular heats since seven months. Mated December 16th, 1929. In February the abdomen enlarged and on March 1st makes straw nest. Teats give serosity. The bitch is uneasy, depressed, no appetite and temperature is raised. On radioscopic examination the uterus is found empty.

. . . . .

In a discussion which followed the reading of the communication, M. Cocu remarked that such observations were quite commonly noted. Everyone had seen bitches two months after being in heat, with or without service or fecundation, to show signs of imminent or recent maternity, and a modification of character that has led to suspicion of rabies.

At the session held on May 7th, M. Cocu made further remarks on the subject, stating that as a pupil the facts had been taught to him and were described in classic books on physiology and obstetrics since the 17th century by Harvey, 1651, Burdach, Buffon, Delafond, St. Cyr and others. The condition was seen in the bitch, the rabbit and, rarely, in the cat. Chauveau had reported one such case in a mare to St. Cyr. In 1857 H. Bouley, in discussing a communication by Delafond on the subject, stated that the condition had already been described by several authors. In conclusion, M. Cocu observed that no mention had been made in the note of previously recorded cases and that it would be regrettable if foreign readers of the *Bulletin* supposed for a moment that the facts submitted for the appreciation of the Academy were new to it.

W. R. D.

[**Electrical Anæsthesia applied to the Slaughtering of Animals in Slaughterhouses.** Marti, P. *Revista de Higiene y Sanidad Pecuarias.*]

The stunning of small animals by electricity prior to bleeding was tried in several slaughterhouses in Germany in 1927 and since then has been adopted as the official method in Munich. The apparatus used has been patented in all countries by a German establishment. It enables an ordinary lighting current to be converted into one of 40 volts and a frequency of 8,000 to 10,000 per minute. This bears no resemblance to the current used for electrocution, when a very high tension is necessary.

Recently, the apparatus was given an extensive trial in Madrid, when it was found that calves, sheep and pigs were instantaneously anæsthetised and that bleeding could be effected without causing struggling or other signs of pain. The carcasses from animals thus slaughtered were examined by veterinary surgeons and found to be in perfect condition. Some of the animals stunned were allowed to recover, and this occurred within three minutes, the animals walking away normally and searching for food.

The operator is adequately protected, and there is no possibility of the current being turned on by accident.

R. S. R.

[**On the Value of some Anticoagulants in Veterinary Surgery.** Dr. Srnetz. *Prager Archiv. f. Tiermed.* 1931. Vol. 11, Nos. 3 and 4.]

After a general discussion on the methods of hæmostasis and on the theories concerning the coagulation of the blood, the author gives the results of his own researches on the problem of shortening the time required for drawn blood to coagulate by the intravenous injection of certain substances. In these experiments the method of Bürker for estimating the time required for coagulation of the blood was used, although the margin of error is not insignificant in this as in all other methods. Healthy horses and dogs were used and each one once only, to remove the possibility of error due to long lasting effects of the one injection. Various substances, which have from time to time been considered as possessors of the power to hasten the coagulation of blood, were injected intravenously in variable doses and the findings were as follows:—

Congo Red.—Seven dogs were given amounts of a 2 per cent. sol. varying from 0·1 to 0·3 grams and in no case was there a reduction in the time required for coagulation. One dog died of shock two hours after the injection, but the rest showed no disturbance. The result was the same

in seven horses, which were given from two to 10 grams. Another horse dosed with 20 grams showed accelerated pulse and respiration soon after the injection but a return to normal took place by the end of one hour.

Sodium Chloride.—Ten horses were given from 5 to 150 grams of common salt and only with doses above 100 gm. was there a consequent increase in the rate of blood coagulation.

Calcium Chloride.—Six horses were given from 15 to 80 grams. In three horses which received more than 25 gm. there was a slight increase in the coagulation rate directly after the injection. A dose of 80 gm. caused syncope with sudden death during systole and only a small amount of blood ran out of the severed neck bloodvessels.

Calcium Lactate.—Seven horses were given from 8 to 70 grams and only doses of more than 50 gm. caused any increase in coagulation rate. Both calcium lactate and chloride caused an acceleration of pulse and respiration rate as well as cardiac arythmia at about one hour after the injection.

Blood.—Blood taken from healthy horses and injected in doses of 300 to 1,500 c.c. into four different test horses did not have any effect on the coagulation rate of blood subsequently drawn.

"*Koagulen.*"—This, a proprietary extract of blood platelets, was given in normal saline to six dogs in doses of 0·2 to 2·5 grams and in no case was there any appreciable increase in the coagulation rate of their blood.

In an investigation into the rate at which blood drops from a hollow needle of convenient size inserted into the lumen of a vein (calculated by the number of drops of blood per fixed period) Srnetz found that marked differences exist between different animals of the same sort and size, but he gives no comparative information concerning the blood pressure of these animals at the time.

The number of drops of blood that fell from the needle inserted into the jugular vein of horses was observed before and after some of the above-mentioned substances had been injected. In most cases no change in the rate followed. After the injection of 0·08-0·14 gram of Pepton-Witte per kg. bodyweight blood flowed for longer, *i.e.*, the coagulation of the blood was inhibited.

With regard to practical hæmostasis, this work has but tended to show that no suitable substance, that can arrest hæmorrhage by causing coagulation of the blood, is known.

A long reference list is given and also information as to where a larger one is published in another periodical.

J. T. E.

Research on Pig Diseases.

The Pig Industry Council, over which Lord Radnor presides, pursues its useful work.. A report now published shows that the council has given much consideration to the measures that might be taken to reduce the heavy losses from diseases which retard the proper development of the pig breeding industry in this country.. The council expresses the opinion that more active steps should be taken to combat diseases like swine fever, and suggests the establishment of a central station where continuous and intensive research could be carried out and the control of sera and vaccines so as to maintain a high standard of potency. It is also recommended that the veterinary profession and farmers should be kept in closer touch with the progress of research.—*The Times.*

N.V.M.A. Divisional Reports.

West of Scotland Division.*

Annual Meeting at Glasgow.

The Annual Meeting of the West of Scotland Division was held on April 8th, 1931, in the Royal Hotel, Glasgow, Professor G. W. Weir occupying the chair.

In addition to the President the following members and visitors attended: Major J. G.McGregor, Professor William Robb, Messrs. Hugh Begg, junr., Alex Thomson, James F. Taylor, Peter Wilson, David Brown, James Macfarlane, Peter Meikle, William Harley, C. Macpherson, Esmond Brown, James Lindsay, Professor G. F. Boddie, Major A. Douglas and Mr. D. Campbell (Hon. Secretary).

Communications regretting inability to attend were intimated from Principal Whitehouse and Mr. A. Stark.

The minutes of the previous meeting, as printed in the *Veterinary Record* of February 21st, were taken as read, and so adopted.

The Hon. Treasurer submitted the annual statement of accounts. In doing so he said that in the number of meetings held and the excellence of the papers and discussions, the year had been a most satisfactory one. He regretted that this general activity had not been reflected in a brighter state of the Division's finances.

Major McGregor said that it was usual for the Division to make a donation to the Victoria Veterinary Benevolent Fund, and he proposed that the question of a donation in the year upon which they were now entering should be remitted to the Divisional Committee.

Election of Office-bearers.

President.—The President observed that he had been an office-bearer in the Division for very many years. For a long period he had served as Secretary, and for the past two years he had had the honour of being President. The West of Scotland Division had been part of his life and he had been proud and happy in his association with it.

As his successor in the Chair he wished to propose their Senior Vice-president, Mr. Peter Meikle. This was seconded by the Secretary and carried unanimously.

Mr. Meikle, in assuming the chair, thanked the members for the honour thus accorded him, and said that if they continued to work together as they had done, the Division would maintain its splendid record of usefulness.

The other appointments made were:—

Vice-presidents.—Major J. G. McGregor and Mr. James Macfarlane.

Secretary and Treasurer.—Mr. Donald Campbell.

Auditors.—Mr. James Macfarlane and Mr. Robert Mitchell.

Representatives to Council, N.V.M.A.—Principal A. W. Whitehouse and the Hon. Secretary.

Representative to Committee of Scottish Branch.—Professor William Robb.

Divisional Committee.—The President, Major McGregor, Mr. James Macfarlane, Professor Weir and the Secretary.

The Tuberculosis Eradication Scheme.—The President said that for some time a feature of their meetings had been a statement by Major McGregor on the progress of

*Received for publication, August 20th.

the scheme for the eradication of bovine tuberculosis promulgated by the Scottish Branch. To-day he was glad to see among them Major Douglas, who had acted throughout as Secretary to the Tuberculosis Committee of the Branch, and he was going to ask if on this occasion Major Douglas would be good enough to make the survey of events for them.

Major Douglas then related the progress of the scheme, touching particularly on the reception of a deputation by the Minister of Agriculture, the discussions with the directors of the Highland and Agricultural Society, and the mapping out, at the request of the Minister, of an experimental area in Ayrshire. The purpose of the experiment was to discover approximately what proportion of cattle-owners would take advantage of the scheme voluntarily, and to provide data which would enable them to arrive at a reasonably accurate estimate of the probable cost.

The President then called on Major J. Gillray McGregor to give his paper on "The Warranty Attached to Cows Sold in the Markets in the South and West of Scotland." [Major McGregor's paper and a report of the ensuing discussion (opened by Mr. J. F. Taylor) are reproduced earlier in this issue of the *Record*.—Ed.]

After Major McGregor had spoken, Major Douglas suggested that the Divisional Committee should consider this question of warranty with a view to attaining clearness in interpretation and something approaching uniformity of procedure at the various sales. This was agreed to and it was remitted to the committee accordingly.

Donald Campbell, *Secretary.*

Eastern Counties Division.*

Summer Meeting at Cambridge.

The summer meeting of the Eastern Counties Division, N.V.M.A. was held at the Field Laboratories of the Institute of Animal Pathology, Cambridge University, on Thursday, July 9th.

There were present the President (Mr. H. P. Standley, senr.) and the following members: Messrs. P. R. Turner, R. E. Glover, T. J. Bosworth, S. Bennett, W. H. Dennett, H. P. Standley, junr., P. Welch, S. E. Hill, W. Waters, E. B. Reynolds, J. Loveless, G. H. Leader, J. B. Buxton, G. H. Livesey, H. R. Allen, T. G. Heatley, W. Shipley, D. Blyth, F. Blackemore and W. A. Wood.

The following visitors were present: Sir John M'Fadyean, Colonel P. J. Simpson, Messrs. H. C. Reeks, Dr. G. Lapage, C. Wright, A. J. Wilsdon, J. R. Maitland Innes, J. A. Nicholson and J. G. Runciman.

Apologies for non-attendance were received from Messrs. C. C. Nesling, A. Millar, B. A. Claxton, J. R. Thursford, A. F. Castle, W. F. Howes, H. E. Wilkinson, J. Bambridge and W. H. Wortley.

After a brief business meeting, visits were paid to the several branches of the Institute, where great interest was shown in the various exhibits. After these had been examined and discussed an adjournment was made to Professor Buxton's garden where a very excellent tea was thoroughly enjoyed by all present. The President proposed a vote of thanks to Professor and Mrs. Buxton for their hospitality and said that the Society was extremely pleased to have been able once more to hold a meeting at Cambridge, where they were always sure of plenty of things of great interest to see and where much useful information was to be obtained and great hospitality to be enjoyed. These observations were received with applause.

Professor Buxton thanked the President for his expressions of thanks and said how glad he was to welcome them all to the Institute that day. Unfortunately, Mr. G. P. Male, who had promised to be present, had telephoned to say that he was prevented from coming, which besides in itself being a matter of great regret to them all, spoilt what would have been a unique experience in having present at that gathering the President and Past-President of the Royal College of Veterinary Surgeons and the President and Past-President of the "National." Nevertheless, they had the pleasure of Sir John M'Fadyean's company that day and thought it was exceedingly good of him to have come such a long way with the prospect of motoring back to Leatherhead the same evening. It spoke volumes for Sir John's enthusiasm, but of course they all knew they could count on this from the Father of Comparative Pathology. They were also all very pleased to have with them the President of the National—Colonel P. J. Simpson.

Business Meeting.

A brief business meeting was now held, with the President in the Chair.

Correspondence.—The Secretary stated that a letter had been received from the N.V.M.A. to the effect that the Council of the R.C.V.S. disapproved of its members using letters after their names indicating membership of societies, such as the N.V.M.A., etc.

Mr. P. R. Turner proposed a resolution to the effect that the meeting strongly disapproved of the use of such titles.

Mr. W. Shipley seconded the resolution, which was carried unanimously.

Mr. W. Shipley then put the resolution of which he had given notice at the last meeting, *viz.*:—

"That a sum of £25 from the funds of the Society be credited to the Congress Entertainment Fund and any surplus be distributed *pro rata* among the guarantors to the Fund." Mr. Shipley said that, as the Society was in a sound financial condition, he thought that this would help to distribute the expenses of the Congress more evenly among the members of the Society and that if the amounts subscribed or guaranteed would, as the Hon. Secretary anticipated, more than cover expenses, then the surplus would come in useful in relieving the guarantors of some of their responsibility. This was seconded and carried without any opposition.

New Member.—Mr. F. Blakemore, M.R.C.V.S., having been duly proposed and seconded, was unanimously elected a member of the Society.

Next Meeting.—The President observed that, as the next item was to select a place for the autumn meeting, at which it was usual to hold the competition for the Shipley Cup, he would be very pleased if the Society would hold that meeting at Norwich, when his green would be at their disposal. The invitation was unanimously accepted, the date fixed being September 16th.

The meeting then adjourned to visit the laboratories.

W. A. Wood, *Hon. Secretary.*

* Received for publication, August 20th.

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Sept. 17th.—Meeting of the Midland Counties Division, N.V.M.A., at Birmingham.

Sept. 17th..—Meeting of the Eastern Counties Division, N.V.M.A., at Norwich.

Sept. 21st.—Meeting of the Editorial Committee, N.V.M.A., 2 Verulam Buildings, Gray's Inn, at 4.30 p.m.

Norwich Congress Number.

Our next issue, which will be considerably enlarged, will be devoted to reports of proceedings of the highly-successful Congress held by the National Veterinary Medical Association at Norwich from August 22nd to 28th.

Commencing with the valuable address delivered by the re-elected President (Lieut.-Colonel P. J. Simpson) the Congress Number will also include, among many other interesting features, an art-plate photograph of delegates and visitors, a full report of the business proceedings, and detailed accounts of the ceremonial and social functions. The first of the reports of discussions on papers presented to Congress (that on Mr. Anthony's paper "Some Common Diseases of Pigs") will also be inserted.

Personal.

A long record of yeoman service to the farming community of East Anglia (of which fraternity as well as our own, he is a member) stands to the credit of Mr. H. H. Truman, J.P., M.R.C.V.S., of March, who, we are interested to learn, has been re-elected Chairman of the March Branch of the National Farmers' Union and Vice-Chairman of the Isle of Ely County Branch of that organisation, after continuous occupancy of both positions since their inception—in the first case a tenure of 21 years. Early this year Mr. Truman was re-elected to the March Urban District Council after serving on that body for 26 years, and of which he is Senior Ex-Chairman.

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Wills.—Mr. Henry James Dawes, F.R.C.V.S., of West Bromwich, late Hon. Secretary, N.V.M.A. (net personalty £51,326): £57,368.

Mr. Francis William Smith Clough, M.R.C.V.S., of 8, Molton Place, Halifax, formerly in practice in Morley, who died on July 4th, aged 62 years, left gross estate of the value of £10,111 18s., with net personalty £9,968 8s. 6d.

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Appointment.—The Secretary of State for the Colonies has appointed Mr. J. Anderson, M.R.C.V.S., as Veterinary Officer, Kenya Colony and Protectorate.

Death of Dr. Louis Sambon.

Many veterinarians will deeply regret to learn of the death in Paris, on August 31st, of Louis Westonra Sambon, M.D., who was a familiar figure as a visitor at veterinary meetings in London.

Dr. Sambon had been a lecturer at the London School of Tropical Medicine, and had done valuable work in cancer research.. The son of Commendatore Jules Sambon, he was educated at the University of Naples (M.D. 1891) and St. Bartholomew's Hospital. For his services in the cholera epidemic of 1884 he received medals from the French and Italian Governments, and he wrote on sleeping sickness, blackwater fever, and the relation of the prevention of infectious disease to our knowledge of epidemics. Dr. Sambon was a delegate to the International Conference on Sleeping Sickness.

Export of Pedigree Stock.

A marked falling off has been evident in the export trade in pedigree livestock this year. Returns show that in the April-June period only 543 cattle were shipped, which is half the number recorded for the same period last year. The prices were also considerably less. The Irish Free State was again the chief buyer, but since June a large consignment of Shorthorn and Hereford bulls has been shipped to Russia.. Very little export business has been done this summer by sheep breeders, and the pig trade has been little better.

H.M. Stationery Office Publications.

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

	Price Net. s.	d.	*Post Free.* s.	d.
House of Commons Reports and Papers:—				
140. Experiments on Living Animals. Return showing the Number of Experiments on Living Animals during the year 1930	1	3	1	5
Agriculture and Fisheries, Ministry of:—				
Advisory Leaflets. (24-9999):—				
17.. Swine Erysipelas	0	1	0	1½

Heavy Horse Grants.

In a recent issue of *The Times*, Mr. James Forshaw, of Sutton-on-Trent, writes as follows, in the correspondence columns:—"Of all the benefits agriculturists have received from the Ministry of Agriculture none has been more beneficial and popular or more highly appreciated than the heavy horse grants.

"These grants have enabled large numbers of small as well as large farmers to co-operate and have been the concrete basis on which they have built up many horse-breeding societies throughout the length and breadth of the land. Farmers have thus been enabled to secure and hire stallions of a much greater value and quality for the use of themselves and the breeding districts than their attenuated circumstances would otherwise have allowed, thus securing better animals all round on the farms and having better animals to sell into commerce, etc., at better prices. The draught horse market has kept improving, and it is proving to be a market where farmers can at least reap a profit; and there are few profitable markets open to agriculturists at present.

"Surely horse breeding ought to be encouraged and not discouraged. I believe that Governments are now out to help agriculture, so would it not be a lamentable act of false economy to withdraw so beneficial a grant as the heavy horse grants, especially during this crisis? These grants cost the country only a few thousand pounds a year, but the good they do is out of all proportion to the small cost, and therefore they ought not to be withdrawn."

[*Photo by T. H. Greville, Maidenhead.*

LIEUT.-COLONEL P. J. SIMPSON, D.S.O., T.D., J.P., F.R.C.V.S.

President of the National Veterinary Medical Association of Great Britain and Ireland, 1931-32.